

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for control of mobile packet flows forwarded on the IP based user plane ~~characterized by,~~ comprising the steps of:
  - a. controlling ~~the individual~~ mobile packet flows from a common, ~~IP-IP-~~based control plane provided with midcom agents, said control being provided by:
  - b. each mobile packet flow registering its presence in each middlebox it encounters on its way from its source to its destination ~~at-in~~ the user plane, and
  - c. in response to ~~this step b,~~ each middlebox registering itself and the mobile packet flows it handles at ~~an a~~ midcom agent ~~at-in~~ the control plane ~~with which they communicate~~ using an extended midcom signalling protocol, and
  - d. after step c, the midcom agent ~~[[,]]~~ now having knowledge of the registered flows ~~[[,]]~~ signalling control orders to the registered middleboxes ~~that registered~~, said orders pertaining to the handling of the mobile packet flows at ~~the~~ respective middleboxes.
2. (Currently Amended) A method in accordance with claim 1, ~~characterized by further~~ comprising the midcom agent sending its control orders to an individual mobile packet flow via the middlebox at which said mobile packet flow registers.

3. (Currently Amended) A method in accordance with claim 1, ~~characterized by further~~ comprising the midcom agent sending its control orders to an individual mobile packet flow via another midcom agent than that at which the mobile packet flow registered.

4. (Currently Amended) A method in accordance with claim 1, ~~characterized by further~~ comprising the midcom agent using the identity of the middlebox (MB)-that registered in order to find the functionality the middlebox has and provide a corresponding control order that it sends to the middlebox.

5. (Currently Amended) A method in accordance with claim 1, wherein the midcom agent controls a number of middleboxes provided in a network ~~characterized by comprising:~~

- a. an ingress middlebox-~~(IN)~~, sitting on the edge of the network where an individual mobile packet flow enters the network, filtering out control messages and tunnelling them to the midcom agent, and
- b. the midcom agent, in response sending control messages to each of the middleboxes it controls, ~~this~~-dividing the IP layer into an IP control layer and an IP user plane.

6. (Currently Amended) A method in accordance with claim 1, ~~characterized by further~~ comprising the midcom agent ~~uses using~~ a routing table to send ~~the~~ control messages to the respective middleboxes on the IP control plane using an extended midcom protocol.

7. (Currently Amended) A method in accordance with claim 1, ~~characterized by further~~ comprising the midcom agent ~~sends the sending~~ control messages to the middleboxes by first sending them to the ingress middlebox (IN) from which they are sent in the same channel as the user data.

8. (Currently Amended) A method in accordance with claim 1, wherein a domain comprises middleboxes and a midcom agent, ~~controlling these~~ characterized by the method further comprising:

- a. forwarding control messages from one domain to another by having an ingress middlebox, sitting on the edge of a network at which an individual mobile packet flow enters,
- b. filtering out control messages and tunnelling them to the midcom agent, and
- c. ~~and the~~ midcom agent forwarding them to an egress middlebox at which the mobile packet flow exits the network.

9. (Currently Amended) A method in accordance with claim 8, ~~characterized by further~~ comprising exchanging step c. for ~~the a~~ step of returning the ~~signalling a control~~ message to the ingress middlebox (IN) from where it is forwarded along a same path as the user data flow.

10. (Currently Amended) A method in accordance with claim 1, ~~characterized by several~~ further comprising plural midcom agents, provided at the IP control plane, simultaneously controlling one and the same mobile packet flow.

11. (Currently Amended) A midcom agent ~~characterized by comprising~~ a plurality of control function sets, each set relating to the operation of an individual middlebox, and comprising control orders for control of the operation of the corresponding middlebox according to the method claimed in ~~claims-claim~~ 1.

12. (Currently Amended) A communication system comprising:  
\_\_\_\_\_ a plurality of IP based networks; and  
\_\_\_\_\_ a session controller for set up of a communication path that traverses selected one of the networks, each selected network having an ingress middlebox (~~IN~~) at which a user flow enters the network and an egress middlebox (~~EN~~) at which the flow exits the network, **characterized by**  
\_\_\_\_\_ each network comprising:  
\_\_\_\_\_ -a midcom agent ~~sitting at-located in~~ an IP control plane,  
\_\_\_\_\_ a plurality of middleboxes ~~sitting at-located in~~ an IP user plane,  
\_\_\_\_\_ an extended midcom protocol allowing for communication between the midcom agent and the middleboxes,  
\_\_\_\_\_ wherein said middleboxes ~~being adapted-are configured~~ to detect a user flow and register its identity (~~FIID~~) at the midcom agent together with the identity of the middlebox at which the flow was detected, and

\_\_\_\_\_ wherein said midcom agent, in response to a combined flow and middlebox registration, is configured to send ~~sending~~ a flow control order to the middlebox ~~over~~ using the extended midcom protocol, said flow control order instructing the middlebox how to handle the detected flow.

13. (New) The communication system in claim 12, wherein the user flow is a mobile packet flow, and wherein in response to movement of a mobile terminal associated with the mobile packet flow, a new middlebox is configured to detect the user flow and register the identity of the user flow and the identity of the new mobile box with the midcom agent, and the midcom agent is configured to send a flow control order to the new middlebox instructing the new middlebox how handle the detected flow.

14. (New) The communication system in claim 12, wherein the user flow is a mobile packet flow, and wherein in response to movement of a network associated with the mobile packet flow, a new middlebox is configured to detect the user flow and register the identity of the user flow and the identity of the new mobile box with the midcom agent, and the midcom agent is configured to send a flow control order to the new middlebox instructing the new middlebox how handle the detected flow.

15. (New) A midcom agent for controlling mobile packet flows over an IP-based user plane, comprising electronic circuitry configured to:

receive a middlebox registration message from each of multiple middleboxes associated with the IP-based user plane;

register each middlebox for which a middlebox registration message is received;  
receive from each of the registered middleboxes one or more mobile packet flows being handled by each of the registered middleboxes; and  
signal a control order to each of the registered middleboxes for handling the mobile packet flows at each of the registered middleboxes.

16. (New) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to send its control orders to an individual mobile packet flow via the middlebox at which said mobile packet flow registers.

17. (New) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to use the identity of the middlebox that registered in order to find the functionality the middlebox has and provide a corresponding control order that it sends to the middlebox.

18. (New) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to control a number of middleboxes provided in a network comprising:

- a. an ingress middlebox, sitting on the edge of the network where an individual mobile packet flow enters the network, filtering out control messages and tunnelling them to the midcom agent, and
- b. the midcom agent, in response sending control messages to each of the middleboxes it controls, dividing the IP layer into an IP control layer and an IP user plane.

19. (New) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to use a routing table to send control messages to the respective middleboxes on the IP control plane using an extended midcom protocol.

20. (New) A middlebox for controlling mobile packet flows over an IP-based user plane, comprising electronic circuitry configured to:

receive a midcom agent announcement message;

send a middlebox registration message to the midcom agent;

send a mobile packet flow registration message to the midcom agent for one or more mobile packet flows being handled by the middlebox; and

receive a control message from the midcom agent for handling the one or more mobile packet flows.